



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/611,745	06/30/2003	Canan Uslu Hardwicke	121278-1	1348
6147 7590 01/16/2008 GENERAL ELECTRIC COMPANY GLOBAL RESEARCH PATENT DOCKET RM. BLDG. K1-4A59 NISKAYUNA, NY 12309			EXAMINER TUROCY, DAVID P	
			ART UNIT 1792	PAPER NUMBER
			NOTIFICATION DATE 01/16/2008	DELIVERY MODE ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ldocket@crd.ge.com
rosssr@crd.ge.com
parkskl@crd.ge.com

Office Action Summary	Application No. 10/611,745	Applicant(s) HARDWICKE ET AL.	
	Examiner David Turocy	Art Unit 1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 November 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 and 27 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-24 and 27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. Applicant's amendments filed 11/29/2007, have been fully considered and reviewed by the examiner. The examiner notes that claims 1 and 17 have been amended. Currently, claims 1-24 and 27 are pending in this application.

Response to Arguments

2. Applicant's arguments filed 11/29/2007 have been fully considered but have not been deemed persuasive.

The applicant argues against the Bunker fails to disclose a plurality of discrete flow directors, wherein atleast one of the flow directors is associated with respective one of the at least one film cooling hole. Further the applicant argues that Bunker discloses a continuous slot over the holes. The examiner respectfully disagrees. Specifically, the examiner maintains the position that two walls of the slot are a plurality of flow directors and can broadly be considered to be "associated" with one of the film cooling holes. Nothing in the claim requires the flow director is only associated with a single film cooling hole.

The applicant argues that Bunker fails to disclose forming a flow director that is three dimensional projection disposed external to the cooling hole and having limited dimensions in three directions. It is unclear how Bunker fails to disclose as argued. The slot forms walls, each of which is external to the cooling hole and must necessarily have limited dimensions in three directions, otherwise the dimension would be infinity,

Art Unit: 1792

which is not the case in Bunker because the coating with the cooling holes has limited dimensions. The applicants argue that the slot has infinite surface without any limiting dimensions in the main flow direction, however, such a statement appears to be mere allegations and unsupported by factual evidence that the slot in Bunker (and therefore the walls which are read as flow directors) have infinite dimensions. The applicant has argue Bunker does not teach such a limitation, but it is the examiners position that the walls of Bunker must necessarily have limited dimensions, for at least the reasons that they are on a surface of a turbine that has limited dimensions. It is unclear how the applicant is interpreting the limitation "limited dimensions in three directions", however, it appears the applicant is narrowly interpreting the claim to require limitations that are not present in the currently written claims.

The applicant appears to be requiring that each of a plurality of holes has discrete flow director, however, such is not required by the claim. Specifically, the claim only requires that "at least one of the flow directors is associated with respective one of the at least one film cooling hole." Therefore the claim only requires that one flow directors is associated with one film cooling hole and it is moot if the flow director is associated with multiple holes. Additionally, the examiner notes that Bunker discloses providing a slot on a high temperature surface to provide more effective cooling for a row of cooling holes. Additionally, Bunker discloses providing multiple rows of cooling holes and therefore it would have been obvious to one of ordinary skill in the art to have provided multiple slots, one over each of a multiple row of cooling holes, with a

reasonable expectation of successfully providing effective cooling of the high temperature substrate.

The applicant has arguments against Haselbach are considered persuasive because the reference specifically discloses a three dimensional flow directors within the cooling hole, which is specifically excluded from the present claims which require the three dimensional flow director external to the cooling hole that extends through the wall.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-5, 10-20, 23, 24 and 27 are rejected under 35 U.S.C. 102(b) as being anticipated by Bunker et al. (US Patent No. 6,234,755).

Claim 1, Bunker et al. discloses a method for forming a flow director (by forming a slot over the holes) on a component comprising a wall, depositing at least one layer on the wall of the component wherein the deposition includes shaping the layer(s) in accordance with the predetermined shape of the slots and therefore forming the flow director (wall of slot) the formed layer extends radially (~90° from wall) outwards from the initial wall of the component and into a hot gas flow path (65) (column 2 lines 20-24, lines 50-60, figure 3). Bunker et al. discloses the coolant is directed from the film-cooling hole towards the hot surface of the wall, see arrows of coolant flow in figure 3.

(Figure 3, Column 4, lines 15-22). The flow director (wall of slot) fails to extend over the exit site of the film-cooling hole that extends through the wall (see figures). The examiner notes that there are two walls to the slot and therefore there is a plurality of discrete flow directors for each slot and one of the flow directors is associated with one of the film cooling holes (Figures). Additionally, the examiner notes that Bunker discloses forming a slot over a row of holes and discloses multiple rows of holes and therefore teaches multiple slots, each over the multitude row of holes (Column 2, lines 45-50). Additionally, the examiner notes that the flow directors are formed external to the film cooling hole as discussed in section 2 above which is incorporated by reference in its entirety.

Claim 2, Bunker et al. discloses that the deposition comprises depositing a plurality of layers (column 2 lines 61-67) and shaping the layers using a mask to form the flow director, the slot (column 2 lines 50-60).

Claim 3, Bunker et al. discloses the wall has a cold surface and a hot surface (column 4 lines 15-20) with holes extending through the wall for flowing a coolant from the cold surface to the hot surface, and the deposition comprises depositing the layer(s) on the hot surface wall (column 4 lines 5-30, column 5 lines 47-67).

Claim 4, the flow director (the slot) comprises a method of directing the coolant flowing out of the exit site and towards the hot surface of the wall (column 2 lines 13-24) thus the coating acts to form the slot and modifies the flow of the coolant gas.

Claim 5, the flow director comprises a ridge extending along at least a portion of the exit site and further extending to a position downstream of the exit site (figure 4).

Claim 10, the deposition can be more than one layer thus it is formed a plurality of times (column 2 lines 61-67) and is done on more than one hole thus it is formed on a plurality of positions and forms a plurality of flow directors on the wall of the component (column 4 lines 63-54).

Claims 11, 12 and 13 one layer can comprise a metal while another layer comprises a ceramic (column 2 lines 61-67).

Claim 14, the component can comprise a secondary coolant slot (figure 6) in the substrate and this is enhanced by the flow director (the film on top of the slot) as this film makes the slot have a deeper depth and thus enhances the secondary coolant flow (column 9 lines 59-67).

Claim 15 the deposition can be done using CVD or PVD (column 5 lines 47-67).

Claim 16, Bunker et al. discloses that there is a masking step (column 2 lines 50-60).

Claim 17, all the features of this claim have been discussed above except that the part is a turbine component, which is disclosed in column 2 lines 13-24.

Claim 18, Bunker et al. discloses forming a plurality of layers on the wall and shaping the layers in a predetermined shape to form the flow director (column 2 lines 50-60).

Claims 19, 20 and 23 these claims have been described previously above.

Claim 24, Bunker et al. discloses that the protective coating is formed on the hot gas path surface of the component (column 2 lines 40-45).

Claim 27, the wall has four sides and can broadly be classified as a polygonal.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 1-5, 10-20, 23, 24 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bunker et al.

Bunker teaches all that is discussed above. While the examiner maintains the position that Bunker discloses multiple flow directors as discussed in the 35 USC 102(b) rejection above, Bunker discloses providing a slot on a high temperature surface to provide more effective cooling for a row of cooling holes. Additionally, Bunker discloses providing multiple rows of cooling holes and therefore it would have been obvious to

Art Unit: 1792

one of ordinary skill in the art to have provided multiple slots, one over each of a multiple row of cooling holes, with a reasonable expectation of successfully providing effective cooling of the high temperature substrate.

7. Claims 6-9, 21 and 22 rejected under 35 U.S.C. 103(a) as being unpatentable over Bunker et al. in view of Sabol et al. (US Patent No. 6,060,174).

Claims 6 and 21, Bunker et al. discloses all of the features of the claims as discussed above except it does not disclose delivering a mixture through a nozzle onto the wall to form the layer wherein the mixture comprises a powder dispersed in a liquid medium. However, Sabol et al. teaches that when applying a MCrAlY film it can be applied as a powder slurry in a liquid medium using a slurry spray and that this technique is less expensive (column 3 lines 11-49). Accordingly it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Bunker et al. to use a slurry spray to apply the MCrAlY coating as suggested by Sabol et al. as this method is less expensive.

Claims 7 and 22, the part is a turbine engine part and the layer will be heated upon use of the part.

Claim 8, the nozzle must be displaced relative to the wall in order to spray coat the entire surface this would be done in accordance with the shape of the wall.

Claim 9, the spraying would obviously be controlled so that the wall is coated and not other parts that are not supposed to be coated this would be done in accordance with the shape of the wall.

Conclusion

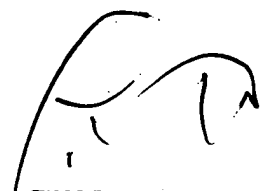
8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. 6,881,439.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Turocy whose telephone number is (571) 272-2940. The examiner can normally be reached on Monday-Friday 8:30-6:00, No 2nd Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

David Turocy
AU 1762



TIMOTHY MEKS
SUPERVISORY PATENT EXAMINER